

What is claimed is:

1. A wheel bearing which comprises an inner member, an outer member, a circular row of rolling elements interposed between the inner and outer members, and a sealing device for sealing an annular end space delimited between the inner and outer members, said sealing device comprising:

first and second annular sealing plates secured respectively to one of the first and second members and the other thereof, and disposed in face-to-face relation to each other;

each of the first and second annular sealing plates including a cylindrical wall and a radial wall assembled together to represent a generally L-shaped section;

the first annular sealing plate being mounted on one of the inner and outer members which is rotatable relative to the other of the inner and outer members, with the radial wall positioned on one side adjacent an exterior of the bearing;

a first elastic member mixed with a powder of magnetic particles and bonded by vulcanization to the radial wall of the first annular sealing plate, the first elastic member being formed with a magnetized portion in which opposite magnetic poles are formed alternately in a direction circumferentially thereof;

the second sealing plate including an elastic sealing member, the elastic sealing member being formed integrally with a side sealing lip slidably engageable with the radial wall of the first annular sealing plate and a radial sealing lip slidably engageable with the cylindrical wall of the first annular sealing plate;

the cylindrical wall of the second annular sealing plate being spaced a slight radial gap from a free periphery of the radial wall of the first annular sealing plate; and

a second elastic material made of a material different from that of the first elastic member bonded to the radial wall and interposed at an engagement of the first annular sealing plate with such one of the first and second members which is rotatable.

2. The wheel bearing as claimed in Claim 1, wherein the second elastic member interposed at the engagement of the first annular sealing plate comprises a coated layer of rubber material applied to the first annular sealing plate.

3. The wheel bearing as claimed in Claim 1, wherein the second elastic member interposed at the engagement of the first annular sealing plate comprises a layer of paint material applied to the first annular sealing plate and having a rust preventive property.

4. The wheel bearing as claimed in Claim 3, wherein the paint material is a polyethylene rubber paint.

5. The wheel bearing as claimed in Claim 1, wherein the second elastic member interposed at the engagement of the first annular sealing plate comprises a layer of adhesive material applied to the first annular sealing plate and having a rust preventive property.

6. The wheel bearing as claimed in Claim 5, wherein the adhesive material is a resinous room temperature setting adhesive having an anaerobic property.

7. The wheel bearing as claimed in any one of Claims 3 to 6, wherein a surface of the first annular sealing plate which forms the engagement has a surface roughness not greater than $R_{max} 3.0$.

8. The wheel bearing as claimed in Claim 1, wherein the inner member has an outer peripheral surface formed with an annular groove and wherein the second elastic member of the different material is a ring-shaped rubber member, the first annular sealing plate being mounted on the inner member through the ring-shaped rubber member.

9. The wheel bearing as claimed in Claim 1, wherein an annular joint between the cylindrical wall and the radial wall of the first sealing plate is provided with a folded portion that extends radially inwardly from the radial wall and joined to the cylindrical wall after having been turned backwards; wherein an annular depression is formed on an outer peripheral end surface of the inner member by radially inwardly depressing to provide a reduced diameter portion; wherein the first annular sealing plate is mounted on the inner member with the folded portion positioned within the annular depression; and wherein the second elastic member of the different material is a ring-shaped rubber member that is interposed between an annular side face of the annular depression and the folded portion.

10. The wheel bearing as claimed in Claim 1, wherein an annular depression is formed on an outer peripheral end surface of the inner member by radially inwardly depressing to provide a reduced diameter portion; wherein the first annular sealing plate is mounted on the annular depression with the cylindrical wall thereof engaged with an outer peripheral surface of the annular depression; and wherein the second elastic member of the different material is a ring-shaped rubber member that is interposed between an axial free end of the cylindrical wall of the first annular sealing plate and an annular side face of the annular depression.

11. The wheel bearing as claimed in Claim 1, wherein the cylindrical wall of the first annular sealing plate is formed with a stop member which is in turn engaged in an annular groove defined on the outer peripheral surface of the inner member.

12. The wheel bearing as claimed in Claim 11, wherein the stop member comprises a bent end formed at an axial free end of the cylindrical wall of the first annular sealing plate.

13. The wheel bearing as claimed in Claim 11, wherein the stop member comprises a plurality of protuberances formed on the cylindrical wall of the first annular sealing plate at a position generally intermediate of an axial length of the cylindrical wall and spaced a distance from each other in a direction circumferentially of the cylindrical wall of the first annular sealing plate.

14. The wheel bearing as claimed in Claim 11, wherein the stop member comprises an annular projection formed in the cylindrical wall of the first annular sealing plate at a location generally intermediate of an axial length of the cylindrical wall and extending circumferentially of the cylindrical wall.

15. A wheel bearing which comprises an inner member, an outer member, a circular row of rolling elements interposed between the inner and outer members, and a sealing device for sealing an annular end space delimited between the inner and outer members, said sealing device comprising:

first and second annular sealing plates secured respectively to one of the first and second members and the other thereof, and disposed in face-to-face relation to each other;

each of the first and second annular sealing plates including a cylindrical wall and a radial wall assembled together to represent a generally L-shaped section;

the first annular sealing plate being mounted on one of the inner and outer members which is rotatable relative to the other of the inner and outer members, with the radial wall positioned on one side adjacent an exterior of the bearing;

a first elastic member mixed with a powder of magnetic particles and bonded by vulcanization to the radial wall of the first annular sealing plate, the first elastic member being formed with a magnetized portion in which

opposite magnetic poles are formed alternately in a direction circumferentially thereof;

the second sealing plate including an elastic sealing member, the elastic sealing member being formed integrally with a side sealing lip slidably engageable with the radial wall of the first annular sealing plate and a radial sealing lip slidably engageable with at least one of the cylindrical wall of the first annular sealing plate and said one of the inner and outer members which is rotatable;

the cylindrical wall of the second annular sealing plate being spaced a slight radial gap from a free periphery of the radial wall of the first annular sealing plate; and

the elastic sealing member having an elastic projection formed therewith so as to extend outwardly therefrom, the elastic projection being elastically engaged with a connecting member that is held in contact with an annular axial end face of the inner member.

16. The wheel bearing as claimed in Claim 15, wherein the connecting member is a constant speed universal coupling having a shoulder that is held in contact with the annular axial end face of the inner member.

17. The wheel bearing as claimed in Claim 15, wherein the connecting member is a crimped portion of a barrel hub which is crimped radially outwardly to confront an axial end of a separate inner race then held in abutment with one end of the barrel hub.

18. The wheel bearing as claimed in Claim 15, wherein the elastic projection is elastically held in contact with an outer peripheral surface of the connecting member.

19. The wheel bearing as claimed in Claim 15, wherein the elastic projection is elastically held in contact with a side face of the connecting member.

20. The wheel bearing as claimed in Claim 15, wherein the radial sealing lip of the second sealing plate is slidingly engaged with the inner member.

21. A wheel bearing which comprises an inner member, an outer member, a circular row of rolling elements interposed between the inner and outer members, and a sealing device for sealing an annular end space delimited between the inner and outer members, said sealing device comprising:

first and second annular sealing plates secured respectively to one of the first and second members and the other thereof, and disposed in face-to-face relation to each other;

each of the first and second annular sealing plates including a cylindrical wall and a radial wall assembled together to represent a generally L-shaped section;

the first annular sealing plate being mounted on one of the inner and outer members which is rotatable relative to the other of the inner and outer members, with the radial wall positioned on one side adjacent an exterior of the bearing;

a first elastic member mixed with a powder of magnetic particles and bonded by vulcanization to the radial wall of the first annular sealing plate, the first elastic member being formed with a magnetized portion in which opposite magnetic poles are formed alternately in a direction circumferentially thereof;

the second sealing plate including an elastic sealing member, the elastic sealing member being formed integrally with a side sealing lip slidingly engageable with the radial wall of the first annular sealing plate and a radial sealing lip slidingly engageable with the cylindrical wall of the first annular sealing plate;

the cylindrical wall of the second annular sealing plate being spaced a slight radial gap from a free periphery of the radial wall of the first annular sealing plate; and

of the first and second annular sealing plates, at least the first annular sealing plate being prepared from a steel plate made of a magnetic material, the steel plate having a surface formed with a metallic layer made of metal having a Young's modulus of elasticity that is lower than that for the one of the first and second members which is rotatable.

22. The wheel bearing as claimed in Claim 21, wherein the metallic layer is a metal plated layer.

23. The wheel bearing as claimed in Claim 21, wherein the metal having the lower Young's modulus of elasticity is selected from the group consisting of zinc, tin, gold, silver and copper.

24. The wheel bearing as claimed in Claim 21, wherein the metallic layer has a thickness within the range of 5 to 30 μ m.

25. The wheel bearing as claimed in Claim 21, wherein a surface of the first annular sealing plate which forms the engagement has a surface roughness not greater than R_{max} 3.0.

26. The wheel bearing as claimed in Claim 21, wherein a surface of the engagement of one of the first and second members, which is rotatable, with the first annular sealing plate is formed as a ground surface which has been plunge cut.

27. The wheel bearing as claimed in Claim 26, wherein a surface of the one of the first and second members, which is rotatable, that is engaged with the annular sealing plate has a surface roughness not greater than R_{max} 3.0.

28. A wheel bearing which comprises an inner member, an outer member, a circular row of rolling elements interposed between the inner and outer members, and a sealing device for sealing an annular end space

delimited between the inner and outer members, said sealing device comprising:

first and second annular sealing plates secured respectively to one of the first and second members and the other thereof, and disposed in face-to-face relation to each other;

each of the first and second annular sealing plates including a cylindrical wall and a radial wall assembled together to represent a generally L-shaped section;

the first annular sealing plate being mounted on one of the inner and outer members which is rotatable relative to the other of the inner and outer members, with the radial wall positioned on one side adjacent an exterior of the bearing;

a first elastic member mixed with a powder of magnetic particles and bonded by vulcanization to the radial wall of the first annular sealing plate, the first elastic member being formed with a magnetized portion in which opposite magnetic poles are formed alternately in a direction circumferentially thereof;

the cylindrical wall of the second annular sealing plate being spaced a slight radial gap from a free periphery of the radial wall of the first annular sealing plate; and

the second sealing plate including an elastic sealing member, the elastic sealing member being formed integrally with a side sealing lip slidably engageable with the radial wall of the first annular sealing plate and a radial sealing lip slidably engageable with an outer peripheral surface of the one of the inner and outer members, which is rotatable, and adjacent an engagement surface of the first annular sealing plate with such one member.

29. The wheel bearing as claimed in Claim 28, wherein an annular depression of a depth corresponding to a thickness of the first annular

sealing plate is formed on the one of the first and second members, which is rotatable, and wherein the cylindrical wall of the first annular sealing plate is press-fitted around an outer peripheral surface of the annular depression.

30. The wheel bearing as claimed in Claim 28, wherein the radial sealing lip of the second sealing plate is inclined so as to extend outwardly of the bearing.

31. The wheel bearing as claimed in Claim 28, wherein the side sealing lip of the second annular sealing plate is provided at two locations spaced radially.

32. The wheel bearing as claimed in Claim 28, wherein the first annular sealing plate is made of a ferrite stainless steel.

33. The wheel bearing as claimed in Claim 28, wherein at least one of a free peripheral edge of the radial wall of the first annular sealing plate and the cylindrical wall of the second sealing plate is provided with an overhang portion defined by a portion of the elastic member integrated with the annular sealing plate and wherein a maximum diameter portion of the free peripheral edge of the radial wall of the first annular sealing plate including this overhang portion has a diameter greater than a minimum diameter portion of an axial free end of the cylindrical wall of the second annular sealing plate and is positioned inwardly of the bearing from the minimum diameter portion.

34. A sealing device included in a wheel bearing as defined in Claim 1, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metal and wherein said fixed side annular sealing plate or the elastic sealing member mounted thereon is formed with a projection protruding inwardly of the wheel bearing, said projection being formed so as to be continuous or discontinuous.

35. A sealing device included in a wheel bearing as defined in Claim 15, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metal and wherein said fixed side annular sealing plate or the elastic sealing member mounted thereon is formed with a projection protruding inwardly of the wheel bearing, said projection being formed so as to be continuous or discontinuous.

36. A sealing device included in a wheel bearing as defined in Claim 21, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metal and wherein said fixed side annular sealing plate or the elastic sealing member mounted thereon is formed with a projection protruding inwardly of the wheel bearing, said projection being formed so as to be continuous or discontinuous.

37. A sealing device included in a wheel bearing as defined in Claim 28, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metal and wherein said fixed side annular sealing plate or the elastic sealing member mounted thereon is formed with a projection protruding inwardly of the wheel bearing, said projection being formed so as to be continuous or discontinuous.

38. A sealing device included in a wheel bearing as defined in Claim 1, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metallic non-magnetic material.

39. A sealing device included in a wheel bearing as defined in Claim 15, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metallic non-magnetic material.

40. A sealing device included in a wheel bearing as defined in Claim 21, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metallic non-magnetic material.

41. A sealing device included in a wheel bearing as defined in Claim 28, wherein one of the first and second annular sealing plates which is on a fixed side is made of a metallic non-magnetic material.

42. A sealing device as claimed in Claim 34, wherein in place of the first elastic member including the magnetized portion, the magnetized portion is formed by directly magnetizing the radial wall of the one of the first and second annular sealing plates which is on a rotatable side.

43. A sealing device as claimed in Claim 35, wherein in place of the first elastic member including the magnetized portion, the magnetized portion is formed by directly magnetizing the radial wall of the one of the first and second annular sealing plates which is on a rotatable side.

44. A sealing device as claimed in Claim 36, wherein in place of the first elastic member including the magnetized portion, the magnetized portion is formed by directly magnetizing the radial wall of the one of the first and second annular sealing plates which is on a rotatable side.

45. A sealing device as claimed in Claim 37, wherein in place of the first elastic member including the magnetized portion, the magnetized portion is formed by directly magnetizing the radial wall of the one of the first and second annular sealing plates which is on a rotatable side.